

DOCKET FILE COPY ORIGINAL

**ORIGINAL
RECEIVED**

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20510**

MAR 22 1993

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of

Implementation of Section 17
of the Cable Television
Consumer Protection and
Competition Act of 1992

Compatibility Between
Cable Systems and Consumer
Electronics Equipment

ET Docket No. 93-7

COMMENTS OF GENERAL INSTRUMENT CORPORATION

General Instrument Corporation ("GI") files these comments in the above captioned matter on the subject of compatibility between cable systems and consumer electronics equipment.

GI is a world leader in the manufacture and distribution of equipment for the cable television and satellite industries. Operating through its Jerrold, VideoCipher and Comm/Scope Divisions, GI supplies cable television subscriber and distribution products, satellite encryption technology and equipment, and coaxial and fiber optic cable. GI was also the first to propose and deliver for testing an all-digital advanced television system for selection as the United States terrestrial broadcast standard. Based on that technology, GI has developed NTSC digital compression products for the satellite industry. NTSC digital compression products have been ordered by a number of major cable system operators for deployment in 1994.

No. of Copies rec'd
List A B C D E

0410

GI is part of the Joint NCTA/EIA Cable-Consumer Electronics Compatibility Advisory Group. We remain hopeful that this effort will yield agreed solutions to problems that have prompted this proceeding. Because the work of that group is still in progress, we will limit these comments to address what we believe to be an important principle that we ask the Commission to apply in the development of such rules and regulations as may result from this proceeding. We will also use these comments to provide that information requested by the Commission which is particularly within our area of knowledge and expertise.

1. The Importance of Innovation

This proceeding occurs at what may be the most dynamic time in the history of television delivery. The increasingly widespread deployment of fiber optic cable in cable television systems and dramatic advances in digital video and digital compression technology (in which GI is proud to have played a predominant role) can yield a cornucopia of information products for consumers. Systems offering as many as 500 channels are under consideration.

Three years ago, such developments were considered unthinkable, certainly within the short time in which they have occurred. This rapid change should serve as a reminder to industry and to the Commission that today's solution, crafted to meet a particular problem, may be rapidly overtaken by technology and innovation. It can also serve as a reminder that today's solutions may have the potential to stifle the development of new technology. The Commission should exercise great care in this proceeding to avoid solutions that might

hamper the development and introduction of innovative technology. The very real problems and frustrations experienced by consumers which are caused by lack of compatibility among systems must be addressed, but only in a way that will maintain the incentives and freedom that will allow future innovation.

2. Capabilities of Today's Converters

Section 624A(c) of the Cable Television Consumer Protection and Competition Act of 1992 asks the commission to consider the costs and benefits of imposing compatibility requirements that include functions that allow the consumer to watch a program on one channel while simultaneously using a VCR to record a program on another channel, to use a VCR to tape two consecutive programs on different channels and to use advanced picture generation and display features. Today's addressable descrambling converters are available in a variety of configurations to address these needs.

Many terminals incorporate a time controlled VCR programming function which allows the consumer to program the converter to change channels automatically at future times permitting the consumer to record successive programs, scrambled or unscrambled. A number of devices available today including General Instrument's CFT-2000 incorporate an on-screen display which provides a consumer friendly interface similar to that provided by many VCRs. These converters can optionally be equipped with a remote controlled RF bypass switch allowing the consumer to bypass the converter when viewing non-scrambled channels. In the bypass mode a broadband signal is presented to the television set.

General Instrument also offers a Watch 'n' Record converter which incorporates two tuners and two descramblers. This allows the consumer to watch and record two simultaneous scrambles programs. An on screen display allows the consumer to program the timer controlled recording functions. This device can also be used to drive the "picture

services being transported. For example, it might be used to transport a combination of 10 video, 20 audio, 6-9600 bps asynchronous data and one 192 kbps synchronous data channels in addition to the required control and conditional access information. In this situation, each video signal is transported using about 2.4 Mbps--approximately two percent of the uncompressed rate. The signal can be compressed to lower or higher data rates resulting in more or fewer programs being carried per unit bandwidth. The data rate allocated to a particular program is determined by the content of the programming and its source. Film material which is created a 24 frames per second can be compressed to a greater extent than can a live 30 frames per second football game. The system can be dynamically reconfigured to change the number of programs conveyed in a single channel. A programmer could transmit 6 simultaneous football games in a single 6 MHz channel during a Saturday afternoon and send 10 movies in that same channel during the evening.

This flexible operating environment requires constant configuration control information transmission between the cable system headend and the home. The conventional association of a channel number with a particular program service fades as varying numbers of programs are conveyed in a given 6 MHz channel over the course of the day. The vast increase in channel capacity provided by compression gives the consumer an expanded choice of programming. However, it creates the requirement for sophisticated navigation and control aids such as program guides. These navigation and control aids are likely to change and grow in capability as new services are developed and viewer preference patterns develop and need to be consistent over the base of subscribers served by a

particular system. The cable operator must have the ability to upgrade and enhance these capabilities as required.

The digital platform supports a host of additional information pipeline opportunities. Text type services as a supplement to the television programming have the ability to offer sports scores, stock quotes, news and weather information, subtitles, song lyrics or even let viewers play along with game shows. This digital delivery system coupled with the processing power within the digital consumer terminal can permit a set of services now only accessible via personal computer. This integration within the consumer terminal coupled with the digital pipeline allows for rapid deployment in a cable system independent of the television set lifecycle and is essential to permit the development of the technology and the associated services. The digital delivery system offers digital compact disk quality audio distribution. This audio programming includes stereo television sound, supplementary audio information or second language soundtrack and can also provide independent audio material--i.e. digital radio. The interface needs to be flexible to accommodate a wide variety of program types and consumer listening hardware configurations.

General Instrument's DigiCipher compression program delivery system employs the data encryption standard (DES) developed by the US government which is commonly used for valuable transactions such as electronic funds transfer. The DES algorithm is applied to the multiplexed video audio and data signal providing a much higher level of security than has ever been used for delivery of television services. The cable industry views this

enhanced security as essential to allow the distribution of premium films and events to consumers with minimum risk to the copyright holder.

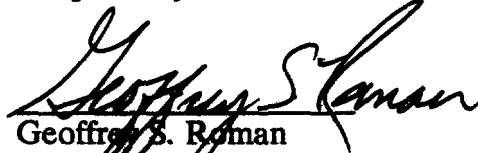
The system employs 64 QAM to distribute the 30 Mbps data streams within the 6 MHz television channel. This modulation technique provides the best combination of efficiency and cost as well as excellent compatibility with conventional analog signals being delivered over the same medium. The 27 Mbps information rate permits the entire information from a digital satellite transponder to be carried in a single 6 MHz channel. A 27 Mbps information rate in the satellite channel allows cable operators to use existing dish antennas for the new digital signals. Maintaining the same information rates in both media reduces the cost of the headend interface to couple satellite delivered programming to the cable distribution system. The 64 QAM requires a lower level of phase noise than is required for satisfactory analog reception. This principally impacts the tuner which should have phase noise of -85 dBc or better.

Conclusion

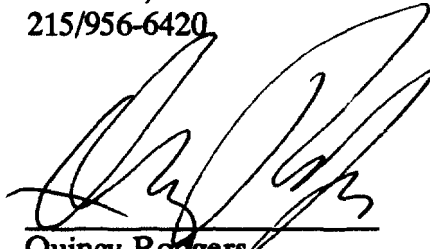
GI does not intend to limit its participation in this proceeding to these initial comments, but will work with members of all industries to try and develop solutions to the

problems which prompted this proceeding.

Respectfully submitted,



Geoffrey S. Roman
Vice President, Technology & New Product
Development
General Instrument Corporation
Jerrold Division
2200 Byberry Road
Hatboro, PA 19040
215/956-6420



Quincy Rodgers
Associated General Counsel;
Director, Government Affairs
General Instrument Corporation
1899 L Street, N.W., Suite 500
Washington, D.C. 20036
202/833-9700

March 22, 1993